



TITLE OF INVENTION

DIGITAL RF TAG

RELATED APPLICATIONS

This Application claims rights under 35 USC § 119(e) from US Application Serial No. 60/350,575 filed January 22, 2002, the contents of which are incorporated herein by reference.

FIELD OF INVENTION

The present invention relates to transceivers and more particularly to radio frequency (RF) tags.

BACKGROUND OF THE INVENTION

An RF tag is a miniature transceiver capable of communicating with a remote platform such as an aircraft or a satellite. Existing RF tags are fairly large, power-hungry, and are usually capable of operating with only a single overflying platform. What is therefore needed is a small, rugged device, capable of battery-powered operation for long periods of time, and with programmability to allow operation with many different platforms for which it is to communicate. Also needed is an RF tag for covert use so that troops wearing the RF tag can operate undetected. For commercial use, there is a requirement for vehicle, package and personnel tracking; as well as a need for a convenient light weight search and rescue device which can be worn.

variable number of time delays between taps. The approach used in the subject tag utilizes a fixed length convolver preceded by a programmable decimator. The result of processing decimated data through the fixed length convolver is equivalent to varying the time delays between the taps, thus to eliminate the problem of providing a bulky expensive variable length convolver. This means that a small fixed length convolver can handle many different interrogating waveforms and need not be specially adapted for each incoming waveform.

As to programmability, most of the operational features are programmable including communication protocols, authentication and interrogation procedures, transmit power, message encoding algorithm, modulation characteristics, frequency, and bandwidth. Moreover, at the level of submodules within the tag, one can use a meander line loaded antenna (MLA) at X-Band. This antenna type is described in U. S. Patent filed 6,765,537 assigned to the assignee hereof and incorporated herein by reference, and has previously been used at lower frequencies.

Moreover, the technique described in U. S. Patent 4,734,751 may be used to achieve variable transmit gain and power. The RF transmit circuitry uses segmented dual gates for digitally controlled variable gain and variable power with very high efficiency. While use of this technique for radars has been described, the use of this approach in a communications application is new and is useful in lowering the returned signal to just that necessary for receipt by an over flying aircraft or satellite. This minimizes detectability of the tag in covert ~~operations~~ operations.

As to applications for the subject digital RF tag, the tag supports automated tracking. The tag has the potential to be used for automated tracking of cargo, vehicles, or other objects.